



THE
ONTARIO WATER RESOURCES
COMMISSION
REPORT ON
GRAND RIVER
WATER POLLUTION SURVEY

1963 to 1964

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ONTARIO WATER RESOURCES COMMISSION

REPORT

ON

GRAND RIVER

WATER POLLUTION SURVEY

DATE - December 1963 to February 1964

REPORT BY: A. C. Cooper, Eng. Tech.

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GRAND RIVER WATER POLLUTION SURVEY

INTRODUCTION

Samples were collected on seven separate occasions from established sampling points on the Grand River and analysed at the Commission Laboratory. The results of this programme are appended.

This particular survey was initiated as a result of difficulties experienced in the treatment processes at the Brantford Water Works. It was believed that the problem may be attributed to the presence of certain by-products associated with industrial cleansers and household detergents discharged to the river from upstream cities.

The samples were taken on Monday and Wednesday of the same week once a month for three months with the exception of the first month when sampling was done on three successive days.

SAMPLING LOCATIONS

The sampling point upstream from Fergus was intended as a control point for reference purposes of successive downstream samples in the concentrated areas of population. The remaining sampling locations were above and below Kitchener, above and below Galt, above and below Paris, at the Brantford Water Works intake, below Brantford and at Caledonia. Samples were taken from overhead bridges with the exception of the samples taken downstream of Brantford. Samples at this location were taken at a bend about eight feet from the river's edge and should be reasonably representative as the main flow of the stream was directed towards the bank.

DISCUSSION OF SAMPLE RESULTS

The OWRC water quality objectives for streams, includes a maximum 5-Day BOD (biochemical oxygen demand) of 4 ppm, a membrane filter coliform count of not greater than 2400/100 ml. and a maximum phenol concentration of 5 ppb.

At sample point G 54.5, downstream of Brantford the BOD objective was exceeded on six of the seven samples. Other sample points exhibiting marginal BOD results were G 74.9 at Paris; G 75.6 downstream of Galt; G 89.8 at Galt; and G 94.3 downstream of the Kitchener WPCP.

Of the seven samples taken at each station, the coliform count was exceeded more than two times at G 54.5, below Brantford; G 86.5, below Galt; G 89.8, in Galt; and at G 110.3, at Bridgeport.

Tests for the presence of phenols were performed on samples taken on January 29th and February 12th. Excessive phenol concentrations commenced at Bridgeport and were present to a lesser degree as far downstream as Dunnville.

A high COD (chemical oxygen demand) was exhibited on a sample taken downstream of Brantford.

Attention is directed to the increase shown in the concentrations of phosphate and anionic detergents (as ABS) as the stream progresses through the populated areas. Phosphates and anionic detergents at the control sample point were present only in trace amounts, but at the Brantford Water Works intake the phosphate level was slightly above 1.0 ppm on three occasions and anionic detergents reached a high of 0.5 ppm.

CONCLUSIONS

The organic content and coliform concentration was excessive at some of the sampling points.

An increase is exhibited in the concentrations of phosphates and anionic detergents in the samples taken between Bridgeport and Caledonia.

All of which is respectfully submitted,

District Engineer:


A. B. REDEKOPP

Approved by:


K. H. SHARPE, DIRECTOR

/mh

SAMPLING POINT NO.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML. MEMBRANE FILTER	5-DAY B.O.D.	TOTAL	SOLIDS SUSP.	DISS.	TURBID- ITY	PHENOLS (PPB)	C.O.D.	PHOSPHATES AS PO ₄	ANIONIC DETERGENT AS ABS.
G.4.9	GRAND R. AT DUNNVILLE	JAN.20/64	40	2.4	624	4	620		9	20	0.9	0.3
G.20.3	GRAND R. AT CAYUGA	JAN.20/64	0	2.3	612	3	609		10	28	1.0	0.3
G.31.3	GRAND R. AT CALEDONIA	DEC.16/63	800	2.6	532	11	521				0.64	0.3
G.31.3	" " " "	DEC.17/63	290	4.1	542	7	535				0.86	0.5
G.31.3	" " " "	DEC.18/63	300	3.3	530	7	532				0.88	0.3
G.31.3	" " " "	JAN.20/64	190	3.0	584	9	575		10	35	2.2	0.3
G.31.3	" " " "	JAN.22/64	118	3.1	574	5	569				0.6	0.3
G.31.3	" " " "	FEB.10/64	270	2.9	444	-	-	7.5			0.57	0.1
G.31.3	" " " "	FEB.12/64	200	2.8	474	-	-	6.5	20		0.53	0.2
G.54.5	GRAND R. AT CAINSVILLE	DEC.16/63	16,100	3.8	558	8	550				0.86	0.5
G.54.5	DOWNSTREAM OF BRANTFORD	DEC.17/63	35,000	40.	660	34	626				1.26	0.6
G.54.5	" " " "	DEC.18/63	5,900	13.	610	17	593				1.14	0.3
G.54.5	" " " "	JAN.20/64	1,850	34.	656	16	640		18	91	1.7	0.4
G.54.5	" " " "	JAN.22/64	3,600	9.0	538	10	528				1.10	0.3
G.54.5	" " " "	FEB.10/64	240	14.	536	-	-	5.5			0.80	0.3
G.54.5	" " " "	FEB.12/64	6,000	16	488	-	-	4.0	15		0.73	0.2

SAMPLING POINT NO.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML. MEMBRANE FILTER	5-DAY B.O.D.	TOTAL	SOLIDS SUSP.	DISS.	TURBID- ITY	PHENOLS (PPB)	C.O.D.	PHOSPHATE AS PO ₄	ANIONIC DETERGENTS AS ABS.
G.BC.66.5	BRANTFORD CANAL AT	DEC.16/63	6	1.3	510	13	497				0.6	0.1
G.BC.66.5	WATSON MFG. (CITY RAW WATER)	DEC.17/63	11,000	3.0	592	5	587				0.87	0.5
G.BC.66.5	"	DEC. 18/63	1,800	3.6	562	2	560				1.0	0.2
G.BC.66.5	"	JAN.20/64	1,070	2.7	528	3	525		9	28.	1.2	0.3
G.BC.66.5	"	JAN.22/64	370	3.7	494	1	493				1.16	0.1
G.BC.66.5	"	FEB.10/64	138	2.8	478	-	-	1.8			0.68	0.2
G.BC.66.5	"	FEB.12/64	1,200	2.4	524	-	-	1.5	8		0.66	0.2
G.74.9	GRAND R. AT HWY.#5 PARIS	DEC.16/63	2,900	4.3	540	3	537				0.60	0.4
"	"	DEC.17/63	9,000	4.5	516	2	514				1.12	0.5
"	"	DEC.18/63	900	4.1	496	3	493				1.20	0.3
"	"	JAN.20/64	340	4.8	502	2	500		8	35	1.5	0.3
"	"	JAN.22/64	480	4.3	508	6	502				1.18	0.4
"	"	FEB.10/64	600	13.	486	-	-	6.5			0.82	0.3
"	"	FEB.12/64	1,500	4.5	496	-	-	2.0	18		0.68	0.4
G.75.6	GRAND R. AT PARIS DAM	DEC.16/63	1,300	2.6	532	1	531				0.92	0.5
"	"	DEC.17/63	1,200	5.1	512	4	508				1.38	0.5
"	"	DEC.18/63	800	3.7	478	5	473				1.34	0.3
"	"	JAN.20/64	400	2.2	492	1	491			28	1.3	0.3
"	"	JAN.22/64	520	3.3	510	4	506				1.44	0.4
"	"	FEB.10/64	800	3.2	472	-	-	1.4			0.83	0.3
"	"	FEB.12/64	11,700	3.9	508	-	-	1.8	15		1.4	0.4

SAMPLING

POINT NO.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML. MEMBRANE FILTER	5-DAY B.O.D.	TOTAL	SOLIDS SUSP.	DISS.	TURBID- ITY	PHENOLS (PPB)	C.O.D.	PHOSPHATE AS PO ₄	ANIONIC DETERGENTS AS ABS.
G.86.5	GRAND R. AT RIVERSIDE BRIDGE	DEC.16/63	5,700	5.2	492	7	485				1.22	0.5
"	DOWNSTREAM OF GALT	DEC.17/63	3,700	6.6	486	6	480				1.54	0.4
"	"	DEC.18/63	4,500	5.1	456	5	451				1.52	0.3
"	"	JAN.20/64	23,100	9.2	504	10	494		12	24.	2.0	0.7
"	"	JAN.22/64	460	4.2	488	6	482				1.24	0.3
"	"	FEB.10/64	78	3.7	454	-	-	2.0			0.80	0.2
"	"	FEB.12/64	1,800	4.4	480	-	-	1.8	0		0.96	0.3
G.89.8	GRAND R. AT GALT DAM	DEC.16/63	4,300	3.2	486	3	483				1.0	0.5
"	"	DEC.17/63	3,100	4.6	482	6	476				1.3	0.5
"	"	DEC.18/63	5,500	4.8	470	3	467				1.28	0.4
"	"	JAN.20/64	2,100	4.2	492	1	491		15	32	1.5	0.4
"	"	JAN.22/64	610	2.5	464	4	460				1.4	0.4
"	"	FEB.10/64	1,500	2.9	456	-	-	1.8			0.86	0.3
"	"	FEB.12/64	1,100	5.1	494	-	-	1.8	4		1.0	0.8
G.94.3	GRAND R. AT BLAIR BRIDGE	DEC.16/63	1,400	6.3	460	10	450				1.02	0.5
"	"	DEC.17/63	238	4.9	446	7	439				0.96	0.5
"	"	DEC.18/63	70	4.4	426	8	418				0.92	0.2
"	"	JAN.20/64	24	5.4	512	9	503		15	43	1.3	0.4
"	"	JAN.22/64	70	3.4	484	13	471				1.22	0.3
"	"	FEB.10/64	1,900	2.1	470	-	-	2.1			0.9	0.3
"	"	FEB.12/64	500	3.7	492	-	-	2.0	9.		0.84	0.2

SAMPLING POINT No.	LOCATION	DATE EXAMINED	COLIFORMS PER 100 ML. MEMBRANE FILTER	5-DAY B.O.D.	TOTAL	SOLIDS SUSP.	DISS.	TURBID- ITY	PHENOLS (PPB)	C.O.D.	PHOSPHATES AS PO ₄	ANIONIC DETERGENTS AS ABS.
G.110.3	GRAND R. AT BRIDGEPORT BRIDGE	DEC.16/63	7,900	3.6	374	6	368				0.15	0.2
"	"	DEC.17/63	4,900	3.8	360	4	356				0.12	.1
"	"	DEC.18/63	5,100	3.4	326	4	360				0.15	TRACE
"	"	JAN.20/64	2,800	2.7	436	2	434		18	24	0.22	0.1
"	"	JAN.22/64	500	3.3	430	6	424				0.30	0.1
"	"	FEB.10/64	106	1.9	398	-	-	1.4			0.15	TRACE
"	"	FEB.12/64	900	2.1	430	-	-	1.7	17.		0.16	TRACE
G.149.3	GRAND R. JUST DOWN- STREAM OF SHAND DAM	DEC.16/63		2.5	258	5	253				0.10	TRACE
"	"	DEC.17/63	150	5.8	280	5	275				0.06	TRACE
"	"	DEC.18/63		3.7	224	3	221				0.10	0.3
"	"	JAN.20/64	14	2.6	342	1	341		-	24	0.14	TRACE
"	"	JAN.22/64	60	2.6	350	8	342				0.14	TRACE
"	"	FEB.10/64	46	1.9	354	-	-	1.8	-		0.04	TRACE
"	"	FEB.12/64	16	2.3	356	-	-	3.5			0.06	TRACE

NOTE : TRACE = < 0.1 PPM.

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Cooper, A C
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